Within the urban campus of San Francisco State University, there lies a school within a school: SF State’s Metro Academy of Science (Metro). This innovative program, started in 2012, is educating the next generation of scientists. It is equipping would-be researchers with 21st century skills such as critical thinking, problem solving, decision-making, and civic engagement. And, say its founders, Metro is helping a more diverse group of students complete college by offering them “engaging, supportive, rigorous, and socially relevant education.” Metro has already prepared 60 ethnically diverse science majors who are well prepared for technical studies and careers. These new millennial scientists are eager to work on science projects for the public good, from curing cancer to tackling climate change.

“SF State’s Metro Academy students possess unique qualities and perspectives that are rarely represented in the sciences.”

-Tatiane Russo-Tait

Before a contemporary college student can become a 21st century scientist, he or she must graduate. It takes more time and more money in 2014 to get a STEM degree—a B.S. in some area of science, technology, engineering, or math—than it did just a decade ago. And for urban students coming to universities from poorly funded K-12 schools, the STEM pathway can take even more than patience and dollars. Before Metro, as few as 11 percent of under-represented minority students in a STEM major graduated within six years. By comparison, within that same time frame, up to 42 percent of STEM majors from all backgrounds will graduate and move on to careers or further education.

That’s where Metro comes in, says program coordinator Tatiane Russo-Tait, with its aim of increasing “our students’ success and persistence by providing academic support and helping them to develop the skills necessary to thrive in the sciences.” SF State’s Metro Academy students possess unique qualities and perspectives that are rarely represented in the sciences, she says. Since Metro Academy of Science is so new, graduation rates can’t be calculated until 2016.

But Metro leaders project that they will quadruple minority STEM graduates from SF State, and in so doing, prepare a new workforce that will expand and broaden America’s scientific community.

Russo-Tait, who goes by Tati (pronounced Ta-chee) to her friends and students, was herself, an under-represented minority student. She earned her B.A. at the University of Hawaii in 2008, and three years later, her M.S. in Stem Cell Science at SF State. She received critical support during her undergraduate years from Professor Donald Price. “Every time I felt defeated, he lifted me up,” said Russo-Tait in a recent interview at her office behind Hensill Hall. Whether an obstacle was lab-related or personal, she explained, Price was always available to her and to other students for advice.

Russo-Tait’s goal is to mentor dozens of pre-science students in the same way. “I’m excited to support Metro students,” she says, because many of these students must navigate academic hurdles as well as solve personal issues such as work, finances, and family responsibilities that may affect their academic success and persistence. “I was like that myself,” she added, “and I want to show them it is possible to do both.”
Metro fosters faculty collaboration across disciplines to meet and coordinate lesson plans, and requires mandatory workshops for professors.

has gotten these students on a “fast-track” to graduation that will help increase the percentage of STEM graduates. The national average time it takes to earn a STEM degree is now six years. Metro’s leaders hope to decrease that average so that SF State’s STEM students graduate in four to five years.

Marilyn Thomas, the coordinator who ran Metro before Russo-Tait, explains that a Metro student’s success rests on two program dividends. First, Metro builds social capital. This means it gives students a feeling of confidence that they belong in a STEM major. Second, says Thomas, Metro aims to produce graduates within five years. This is accomplished by having all of the program’s required course work satisfy both general education and major requirements, thereby giving Metro students a direct path to graduation.

Metro is a two-year-long program for entering freshmen that prepares them to become science majors in their junior and senior years. Metro students enroll in two linked general education courses per semester over a four-semester span. Together, the students form a cohort and become members of a close “learning community” that also includes faculty and academic counselors. All involved come to know each other well. The linked courses have shared themes and readings that are relevant to future science students—especially those concerned about issues of social inequality. For example, one of these linked courses, Health Education 120: Educational Justice, Health Equity, and Academic Success (taught by Russo-Tait) promotes writing, speaking, critical thinking, and quantitative reasoning skills. The professors of the linked courses stay in close communication, and academic counselors check in regularly with Metro students. These efforts keep students on track and help them avoid delays in graduation.

Metro class sizes are capped at about 35 students—noticeably smaller than in typical undergraduate lecture courses. Karen Rivera, a freshman from Los Angeles, said, in a recent interview, that she especially likes the smaller class sizes Metro offers, and finds the professors to be caring and excited about teaching.

The program’s pedagogical approach begins with faculty development, says Russo-Tait. Metro fosters faculty collaboration across disciplines to meet and coordinate lesson plans, and requires mandatory workshops for professors. This ensures, for example, that the professor of a health education class knows what’s being taught in each Metro Academy. SF State is committed to expanding the Metro Academy concept to other majors. Right now, the university offers the Metro Academy of Health, Metro Academy of Science, and Metro Academy of Child and Adolescent Development. In Fall 2014, three new academies will begin, including the Metro Academy of Engineering. At that time, the Metro Science and Metro Engineering program offices will be housed at SF State’s Science Buildings. By 2015, the university will offer a total of 13 academies, all aimed at increasing diversity and expanding graduation rates in various fields.

In the future, Russo-Tait would like to connect Metro students with hands-on experiences such as internships and community service learning projects. One example of the latter involves the Bay Area organization Communities for a Better Environment, with its programs to prevent pollution and promote greener neighborhoods. Hands-on opportunities are important, comments Russo-Tait, so that “students experience the relevance of what they’re learning in science.”

Edgar Velazquez is one of Metro’s many success stories. In a recent interview, he explained the difficulties of being a minority student in the challenging major of Biology: “Being a first generation college student, I had no one to help me navigate the university, so I always looked up to my Metro professors for advice. Without Metro, I probably would have not talked to an advisor my first semester.” Since he did, however, he was able to “develop a five-year graduation plan,” Velasquez said. Being part of Metro has meant that, “I am part of a passionate community that works really hard to achieve social justice.”

Currently, Edgar is a supplemental instruction leader for General Chemistry 1. He will be graduating next year with a B.S. in Biology, concentration in Physiology, and plans on going to medical school. Further, he said, Metro ignited his passion about public health. “Medicine isn’t always at the molecular level—health also comes from social conditions,” he explained. He and his fellow Metro students learned that “economics, family dynamics, and access to food are all factors that affect health.” Science is relevant to everyday life. It provides the answers to many questions like: Can harmful genes be turned off? And how can global warming be halted under control? As the national need for STEM professionals continues to increase, the supply of STEM graduates must increase as well. Metro recognizes the issues that SF State students face. And it provides them with the support they need to succeed and join other scientists to confront the technical and scientific challenges of the 21st century.

Tatiane Russo-Tait, Program Coordinator
SF State’s Metro Academy of Sciences

Left: Metro Science Academy students in the HEd 120 class (Education Justice, Health Equity and Academic Success) taught by Tatiane Russo-Tait. Photo courtesy of SF State’s Metro Science Academy.